

Claim Amendments:

Please amend the claims as follows:

1. (Currently Amended) In a data processing system, a method to ~~automatically~~ tune a topology of relationships between a plurality of self-organizing software agents, comprising:

establishing a topology to address each of a plurality of system topology

criteria;

~~operating a topology tuner agent to obtain~~ obtaining information including inter-agent relationship in a manner that is descriptive of the system topology;

~~establishing a topology to address at least one criterion; and~~

~~based at least in part on the obtained information and on the topology of said at least one criterion said topology tuning agent making at least one recommendation to at least one of the plurality of agents that is intended to modify the topology of the at least one of the plurality of agents to more closely match the topology of said criterion~~ a selected one of the plurality of established topology criteria.

2. (Currently Amended) A method as in claim 1, where the step of obtaining information is performed by ~~said~~ a topology tuner agent by querying a system registry to determine identities of individual ones of the plurality of agents.

3. (Currently Amended) A method as in claim 1, where the step of obtaining information is performed by ~~said~~ a topology tuner agent by querying individual ones of the plurality

of agents to determine to which other agent or agents the individual one of the plurality of agents currently has a relationship.

4. (Currently Amended) A method as in claim 1, where the step of obtaining information is performed by ~~said~~ a topology tuner agent by querying a system registry to determine to which other agent or agents that individual ones of the plurality of agents currently have a relationship.

5. (Currently Amended) A method as in claim 1, where the step of obtaining information is performed on a periodic basis by ~~said~~ a topology tuner agent to update the state of the topology, and where the topology tuner agent makes the at least one recommendation when ~~some~~ a topology threshold condition approaching one of the plurality of established criterions is satisfied.

6. (Currently Amended) A method as in claim 1, ~~where the~~ wherein at least one established criterion comprises a vulnerability of the topology to an attack directed to one or more of the agents and another established criterion comprises a vulnerability of the topology to a failure of one or more of the agents.

7. (Canceled)

8. (Currently Amended) A method as in claim 1, where ~~the~~ at least one established

criterion comprises a rate at which agents form new relationships.

9. (Currently Amended) A method as in claim 1, where ~~the~~ at least one established criterion comprises a vulnerability of the topology to an attack directed to one or more of the agents, and where the at least one recommendation does not constrain the set of potential agents that an agent may select from to form a new relationship or relationships such that the topology evolves towards a Gaussian type distribution.

10. (Currently Amended) A method as in claim 1, where ~~the~~ at least one established criterion comprises a vulnerability of the topology to an attack directed to one or more of the agents, and where the at least one recommendation constrains the set of potential agents that an agent may select from to form a new relationship or relationships such that at-risk agents have few relationships, and such that the topology that contains the not at-risk agents evolves towards a Gaussian type distribution.

11. (Currently Amended) A method as in claim 1, where ~~the~~ at least one established criterion comprises a vulnerability of the topology to a failure of one or more of the agents, and where the at least one recommendation constrains the set of potential agents that an agent may select from to form a new relationship or relationship such that the topology evolves towards a scale-free network.

12. (Previously Presented) A method as in claim 1, where obtaining information

comprises monitoring the drift or re-self-organization of the topology over time, and where the at least one recommendation is made to compensate for the drift.

13. (Previously Presented) A method as in claim 1, where obtaining information and making at least one recommendation are performed by a topology tuner agent that is recognized by the plurality of agents to have privileges giving it sufficient nominal authority to make its recommendations to the other agents effective.

14. (Previously Presented) A method as in claim 13, where said topology tuner agent behaves otherwise as a peer agent that uses the same system messaging infrastructure as the other agents.

15. (Previously Presented) A method as in claim 1, where making at least one recommendation is performed by a topology tuner agent using a multi-cast technique to simultaneously contact a number of the agents.

16. (Previously Presented) A method as in claim 1, where making at least one recommendation is performed by a topology tuner agent using a single-cast technique to individually contact the agents.

17. (Previously Presented) A method as in claim 1, where obtaining gathers information concerning all relationships, and where the at least one recommendation applies to all

types of relationships between agents.

18. (Previously Presented) A method as in claim 1, where obtaining information gathers information concerning relationships of a certain type or types, and where the at least one recommendation applies only to the certain type or types of relationships between agents.

19. (Previously Presented) A method as in claim 1, where obtaining information and making at least one recommendation are performed in response to a notification of a change in the topology.

20. (Previously Presented) A method as in claim 1, where obtaining information and making at least one recommendation are performed by a topology tuner agent that monitors how frequently individual ones of the agents change their relationships, said topology tuner agent querying those agents more frequently that more frequently change their relationships.

21. (Previously Presented) A method as in claim 1, where obtaining information and making at least one recommendation are performed by an entity in an environment that hosts the plurality of agents.

22. (Previously Presented) A method as in claim 1, where the plurality of agents operate

with a common set of system policies that are capable of being changed by a policy update procedure, and where making at least one recommendation is performed during a policy update procedure.

23. (Currently amended) A topology tuner software agent operable in a data processing system that comprises a plurality of self-organizing software agents, comprising:

computer program code for establishing a plurality of system topology

criteria;

computer program code for obtaining information that is descriptive of a topology of relationships between the self-organizing software agents from at least one of a system registry function and from the self-organizing software agents themselves; and

computer program code, responsive to the obtained information and a ~~topology corresponding to at least one criterion~~, for making at least one recommendation to at least one of the plurality of self-organizing software agents that is intended to modify the topology closer to the topology corresponding to ~~the at least one criterion~~ a selected one of the plurality of established criteria.

24. (Previously Presented) A topology tuner software agent as in claim 23, where obtaining information is performed periodically by said topology tuner agent to update the state of the topology, and where the topology tuner software agent makes the at least one recommendation in response to a topology threshold condition being satisfied.

25. (Currently Amended) A topology tuner software agent as in claim 23, where ~~the at~~ ~~least one~~ an established criterion comprises a vulnerability of the topology to an attack directed to one or more of the self-organizing software agents.

26. (Currently Amended) A topology tuner software agent as in claim 23, where ~~the at~~ ~~least one~~ an established criterion comprises a vulnerability of the topology to a failure of one or more of the self-organizing software agents.

27. (Currently Amended) A topology tuner software agent as in claim 23, where ~~the at~~ ~~least one~~ an established criterion comprises a rate at which the self-organizing software agents form new relationships.

28. (Currently amended) A topology tuner software agent as in claim 23, where ~~the at~~ ~~least one~~ an established criterion comprises a vulnerability of the topology to an attack directed to one or more of the self-organizing software agents, and where the at least one recommendation does not constrain the set of potential self-organizing software agents that a self-organizing software agent may select from to form a new relationship or relationships such that the topology evolves towards a Gaussian type distribution.

29. (Currently Amended) A topology tuner software agent as in claim 23, where ~~the at~~ ~~least one~~ an established criterion comprises a vulnerability of the topology to an attack

directed to one or more of the self-organizing software agents, and where the at least one recommendation constrains the set of potential self-organizing software agents that a self-organizing software agent may select from to form a new relationship or relationships such that at-risk agents have few relationships, and such that the topology that contains the not at-risk agents evolves towards a Gaussian type distribution.

30. (Currently Amended) A topology tuner software agent as in claim 23, where ~~the at least one~~ an established criterion comprises a vulnerability of the topology to a failure of one or more of the self-organizing software agents, and where the at least one recommendation constrains the set of potential self-organizing software agents that a self-organizing software agent may select from to form a new relationship or relationship such that the topology evolves towards a scale-free network.

31. (Previously Presented) A topology tuner software agent as in claim 23, where said computer program code for obtaining information comprises computer program code for monitoring the drift or re-self-organization of the topology over time, and where the at least one recommendation is made to compensate for the drift.

32. (Previously Presented) A topology tuner software agent as in claim 23, where said topology tuner software agent is recognized by the plurality of self-organizing software agents to have privileges giving it sufficient nominal authority to make its recommendations to the self-organizing software agents effective.



33. (Previously Presented) A topology tuner software agent as in claim 32, where said topology tuner software agent behaves otherwise as a peer agent that uses the same system messaging infrastructure as the self-organizing software agents.

34. (Previously Presented) A topology tuner software agent as in claim 23, where making at least one recommendation is performed using a multi-cast technique to simultaneously contact a number of the self-organizing software agents, or using a single-cast technique to individually contact the self-organizing software agents.

35. (Previously Presented) A topology tuner software agent as in claim 23, where said computer program code for obtaining information gathers information concerning all relationships, and where the at least one recommendation applies to all types of relationships between self-organizing software agents.

36. (Previously Presented) A topology tuner software agent as in claim 23, where said computer program code for obtaining information gathers information concerning relationships of a certain type or types, and where the at least one recommendation applies only to the certain type or types of relationships between self-organizing software agents.

37. (Previously Presented) A topology tuner software agent as in claim 23, where said

computer program code for obtaining information and making at least one recommendation operate in response to a notification of a change in the topology.

38. (Previously Presented) A topology tuner software agent as in claim 23, where said topology tuner software agent that monitors how frequently individual ones of the self-organizing software agents change their relationships, and queries those self-organizing software agents more frequently that more frequently change their relationships.

39. (Previously Presented) A topology tuner software agent as in claim 23, where the plurality of self-organizing software agents operate with a common set of system policies that are capable of being changed by a policy update procedure, and where said computer program code for making at least one recommendation operates through a policy update procedure.

40. (Previously Presented) A topology tuner software agent as in claim 23, where said computer program code is stored on a computer readable medium.

41. (Previously Presented) A topology tuner software agent as in claim 24, where said topology threshold condition is expressed as a variable threshold value.

42. (Currently amended) A data processing system comprising:  
a plurality of self-organizing software agents configurable for

autonomously establishing relationships between themselves, where the totality of the relationships can be represented by a topological structure having nodes that each comprise one of the plurality of software agents and links between the nodes that comprise the established relationships;

data establishing a topology to address ~~at least one criterion~~ each one of a plurality of different criteria;

a topology tuning function that obtains information that is descriptive of the topology including inter-agent relationships and, based at least in part on the obtained information and on the data of the topology ~~to address the at least one criterion~~, that makes a recommendation to at least one of the plurality of software agents that is intended to modify the topology to more closely match the topology of ~~the at least one criterion~~ a selected one of the plurality of established criteria.

43. (Previously Presented) A data processing system as in claim 42, where topology tuning function is performed by a topology tuner software agent.

44. (Currently Amended) A data processing system as in claim 42, where ~~the at least one~~ an established criterion comprises a rate at which software agents form new relationships.

45. (Currently Amended) A data processing system as in claim 42, where ~~the at least one~~ an established criterion comprises a vulnerability of the topology to an attack

directed to one or more of the software agents, and where the at least one recommendation in one case does not constrain the set of potential software agents that a software agent may select from to form a new relationship or relationships such that the topology evolves towards a Gaussian type distribution, and where the at least one recommendation in another case does constrain the set of potential software agents that a software agent may select from to form a new relationship or relationships such that at-risk software agents have few relationships, and such that a portion of the topology that contains not at-risk software agents evolves towards a Gaussian type distribution.

46. (Currently Amended) A data processing system as in claim 42, where ~~the at least one~~ an established criterion comprises a vulnerability of the topology to a failure of one or more of the software agents, and where the at least one recommendation constrains the set of potential software agents that a software agent may select from to form a new relationship or relationship such that the topology evolves towards a scale-free network.

47. (New) A method as in claim 1 wherein the step of obtaining information comprises determining to which one of the plurality of established criteria that the current system topology most closely corresponds.

48. (New) A method as in claim 47 wherein an established criterion comprises a vulnerability of the topology to an attack directed to one or more of the agents and

another established criterion comprises a vulnerability of the topology to a failure of one or more of the agents.

49. (New) A method as in claim 48 wherein the established criterion of vulnerability of the topology to attack evolves toward a Gaussian type distribution and the established criterion of vulnerability of failure evolves toward a scale free distribution.

50. (New) A method as in claim 47 wherein the step of obtaining the current information comprises forming a histogram of the inter-relationships of the plurality of agents.

51. (New) A method as in claim 47 wherein the information is obtained and compared to at least one of the plurality of established criteria.